

# Plasmonic Enhanced Type-II Superlattice Focal Plane Arrays, Phase I

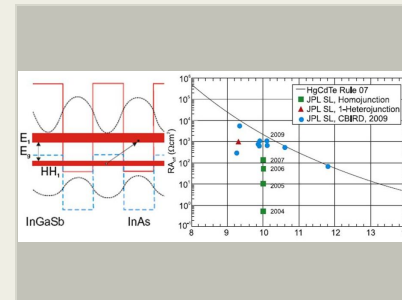
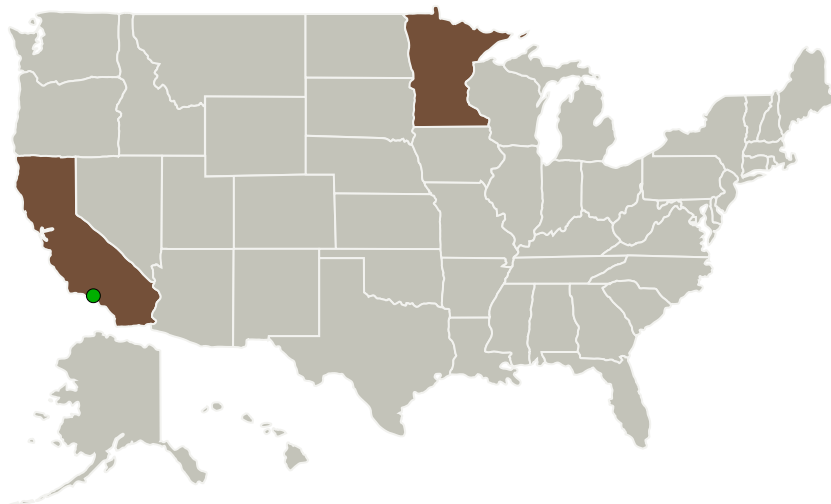
Completed Technology Project (2013 - 2013)



## Project Introduction

SVT Associates proposes an novel type II superlattice structure to extend the cutoff wavelength and CBIRD SL photo diode structure with unipolar barriers to suppress dark current of SL detectors grown on GaSb substrate. This InAs/GaSb superlattice material system is capable of infrared detection in MWIR/LWIR spectral range, depending on layer thickness of each superlattice period. The goal of this program is to develop high performance type II SL based FPA for 5-14  $\mu\text{m}$  detection. Photodetector arrays using this material are of great interest to the NASA for various applications including, in particular, imaging and optical detection, and object discrimination when tracking targets in space or performing astronomical observations. These LWIR photo detectors can also find application to infrared-based chemical identification systems and terrestrial mapping. Applying the dark current suppression and cutoff wavelength extension process to the type-II superlattice detectors should result in higher operating temperature, extended cutoff wavelength, and improved quantum efficiency, all important factors that should significantly enhance FPA operation. We intend to characterize the positive effects of proposed techniques in Phase I. In Phase II we will refine the techniques to realize passive-cooled high-performance LWIR FPAs with quantum efficiency larger than 60%.

## Primary U.S. Work Locations and Key Partners

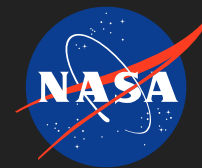


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Organizations Performing Work	Role	Type	Location
SVT Associates	Lead Organization	Industry	Eden Prairie, Minnesota
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

## Primary U.S. Work Locations

California	Minnesota
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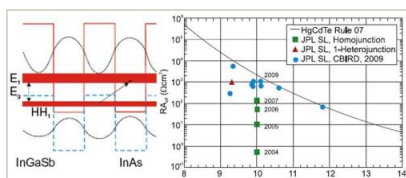
## Project Transitions

**May 2013:** Project Start**November 2013:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138686>)

## Images



## Project Image

Plasmonic Enhanced Type-II Superlattice Focal Plane Arrays  
(<https://techport.nasa.gov/image/126576>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

SVT Associates

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

Carlos Torrez

## Principal Investigator:

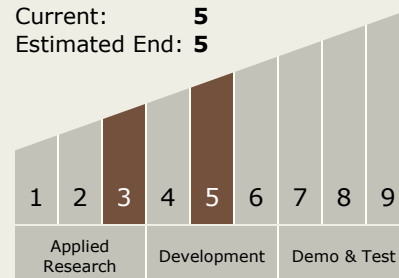
Wentao Lu

## Technology Maturity (TRL)

Start: 3

Current: 5

Estimated End: 5



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## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.1 Detectors and Focal Planes

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System